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Sentimental Objections to Felling Trees.—II.

WE spoke recently of that unwise and sentimental affection for trees, which so often interferes with their removal when removal would mean a conspicuous increase in the beauty of their surroundings; and we argued that its false basis is shown by the fact, that it is as often exhibited in the case of decayed and unsightly trees, as in the case of those which, in themselves, have a clear title to admiration.

But the most unfortunate effect of this unwise affection remains to be mentioned. The spirit which condemns the axe when the interests of general beauty require it to be raised, refuses it likewise when the interests of the trees themselves make the demand. Every walk we take through public park or private grounds, shows us not only many cases where beauty of general effect is injured by superfluous trees, but as many where the trees themselves are injured by overcrowding. Trees which have started spontaneously, or have been carefully planted by a landscape-gardener, in such a way that while young they agreeably clothed the spot and usefully nursed one another, have been allowed to grow into spindling groves or tangled thickets, which are not beautiful as a whole and contain not a single satisfactory specimen of tree-development.

Here, for example, is a solid clump which has no beauty of outline and no variety of light and shadow, and in which the colors of the different species are mixed in a confusion that is not true contrast. Thinned out in time, we might have had instead a smaller number of fine specimens, each graceful in form, each contrasting agreeably in color with its neighbors, and all together making a group or a little wood which would have pleased not only by its beautiful outlines, but by its evidence of healthy growth and luxuriant development. Here, again, is a line of trees which were intended to form a screen to shut out some unsightly object or to conceal the limits of the place. When first planted it did form such a screen, although of inconsiderable height, and with judicious thinning it might have remained a screen while its height increased. But left unthinned it has grown into a spindling row of bare stems, which carry poorly developed heads of foliage far in the upper air, while between them the undesirable object can be clearly seen. In still another place we find two or three trees growing so close together that their branches meet and the growth of each has been checked on the side towards the other. Of course when they are of the same, or of related, species, and stand very near indeed together, the effect may be agreeable, as being the effect of a single large head, supported by two or three stems. But even when they are of the same species the effect is often bad if the stems are so far apart that we clearly realize we have two or three poorly developed specimens where we might have had a single one in beautiful development. And it is a distressing effect indeed when the trees are of different species, and inharmonious one with the other. Quite as often as not this is the case when man's hand has done the planting. It is no uncommon thing, for example, to find instances where a tapering evergreen and a round-headed deciduous tree have been allowed to grow so close together that their alien forms and colors and textures are absolutely welded together in a union as unnatural to the mind as displeasing to the eye.

It is no new grief to which we thus give voice. Doubtless there has never been a time when, by unthinking persons, it was not regarded as, under any circumstances, a crime to cut down a tree. Certainly the literature of gardening art echoes the complaint of the landscape-artist of to-day, that no difficulty with which he has to cope is as great as the difficulty of making an owner thin out his plantations at the proper time and in the proper way. Brown, the famous English landscape-gardener of the last century, has for generations been bitterly abused for forming close, round, hard clumps of trees and spotting them about on lawn and meadow. But there is no doubt that he intended these clumps to be thinned, so that they might eventually resolve themselves into lighter, more varied and more graceful groups. Therefore, when we read of "Brown's clumps" as synonyms for what should be avoided by the planter of to-day, it is not Brown himself but his clients who are really put in the pillory.

It should be remembered that no landscape-gardener can protect himself against a similar fate by planting only those trees which he would like to see in the full-grown group or wood of later years. In the first place, few owners would be content to see the spot for a long period merely dotted over with small, isolated trees; in the second place, young trees must often be planted closely for mutual protection against wind and cold; and in the third place, as no one can predict with accuracy how any given tree will grow, a margin must be left against possible contingencies, not only of life and death, but of peculiarity in development. A planter can hardly imagine in detail the group he wants, and then plant for that group and for nothing else. The best he can do is to decide upon the general size and character of his group; plant in such a way that the probability of getting something near to it in effect will be insured; and then watch his plantation, and thin it out in accordance, on the one hand, with his own wishes, and, on the other hand, with the peculiarities of his developing trees.

Of course such a process as this needs care and thought and taste. But it is just this fact that we desire to impress upon our readers—only by the exercise of care and thought and taste, not only in the act of planting but continually afterwards, can really beautiful results be achieved in any branch of gardening art. After a plantation is made, then the real work of creating it has merely begun; this work must be prolonged for many years, to preserve the beauty of the trees as individuals, no less than to preserve the beauty of the general effect of the scene; and it must very often consist in larger part of the judicious cutting out of individuals which are not only superfluous but detrimental. Yet the hardest task of an artist is to persuade an owner to cut down trees which were never intended long to remain;

and generally it is harder still for an owner to persuade himself to sacrifice a tree of his own planting, even though, by his own confession, it would be far better out of the way.

In the upper part of the lower Michigan peninsula and in the upper peninsula are numerous sandy, barren plains, sometimes called Jack Pine Plains from the prevalence of the Jack Pine (*Pinus Banksiana*) upon them. The largest of these barrens occupies several hundred square miles, and there are others nearly as large. It is believed that these barrens are due to the continual burning of the forest, originally, perhaps, first prostrated by tornadoes. The surface is almost entirely destitute of vegetable-mould; and often it is nothing but a mass of shifting sand, upon which plants are unable to obtain a foothold. The cheapness of these lands has had the unfortunate effect of inducing many emigrants to settle upon them. Hundreds of abandoned homes testify to their worthlessness for agriculture, and stand as witnesses of misdirected labor and disappointed hopes. It is now, however, proposed by the State of Michigan to demonstrate by scientific experiment the value or the worthlessness of these Jack Pine lands. The State Board of Agriculture has established an experimental farm upon land given for the purpose by the Michigan Central Railroad corporation near Grayling, in Crawford County, in the heart of the Jack Pine region. The problem to be solved, as stated by Professor R. C. Kedzie in Bulletin No. 37, from the Experiment Station connected with the Agricultural College of Michigan, which is devoted to this subject, is this: "With a light, sandy soil of very porous quality, in a northern climate subject to late frosts in spring and early frosts in autumn, and liable to midsummer drought, with no fertilizers except marl, salt and plaster, can any methods of tillage or kinds of crops bring these plains into profitable cultivation for ordinary farming, stock-raising, or fruit production?" A thousand years of tree growth, if fires are kept away, may restore some of the lost fertility to these lands, but that any method more rapid in its workings can avail to make them profitably productive, hardly seems probable—a view which more than one settler who has seen his hard-earned savings melt away in an effort to make this land bear fruit, will, we imagine, gladly indorse. It is right, however, to demonstrate by actual experiments, carried on by trained investigators, whether such lands are really worthless, lest the tide of emigration, beguiled by offers of cheap homes, may still continue to press in upon these barren sands.

The following remarkable statement, which has been going the rounds of several of the special journals devoted to the lumber industry of the country, will give some idea of the popular ignorance in regard to trees in this country. The tree referred to is the Virgilia, or Yellow-wood, of which a description and illustration were published in this journal on the 18th of April. The Virgilia is a rare tree in a wild state, although it is not confined to the neighborhood of Nashville, being found more or less abundantly from Kentucky to Cherokee County in North Carolina, and it is now one of the most generally planted and best known ornamental trees in the Northern States:

Within a radius of sixty miles of Nashville, Tenn., there is found a tree that is supposed to be the shittim wood of Bible fame. Celebrated botanists from all over the country have examined the trees and agree that they grow nowhere else on the globe. They have decided that it is the shittim wood of which the tabernacle was constructed, mention of which is made several times in the Bible. The tree is medium-sized, with very dark, smooth bark, and the wood is of a bright gold color. In early spring the trees are laden with long white blossoms, closely resembling great ostrich plumes. There seems to be no doubt about the identity of the trees, and it is remarkable that they are found only in this small area, and so few at that.

A California Garden.

TRAVELERS who visit the Hotel del Monte, at Monterey, are always interested in the strange garden filled with curious forms of vegetable life, generally spoken of as the "Arizona Garden," which the proprietors of this establishment have caused to be collected there from the extreme southern parts of the State and from Arizona.

Our illustration of a part of this garden upon page 403, gives an idea how succulent plants can be grouped together harmoniously, and of the value of such plants in a dry climate like that of California, where green turf cannot be maintained during the summer months without constant watering. The two tall cylindrical plants on the right and left of the picture are young specimens of the tallest of all the Cactus family, *Cereus giganteus;* between these, in the background, is a plant of the noble desert Palm of southern California, *Washingtonia filifera;* and still further in the background may be seen part of the group of Monterey Pines (*Pinus insignis*) which surround the hotel—one of the very few natural growths of this tree—which is one of the least widely distributed of American Pines, although it is now, however, very generally cultivated in the Pacific States and in central and southern Europe.

The Serpent Mound Park.

THE traveler who happens to be passing along the excellent turnpike from Hillsboro to Locust Grove, in Adams County, Ohio, is likely to be surprised when his attention is called to a prominently displayed sign-board, near the eastern end of Brush Creek bridge, with the legend: "Entrance to Serpent Mound Park." One is not prepared for any such announcement. The surrounding country gives no suggestion of a park, to one who drives for miles through a succession of thrifty farms, and an occasional, sleepy, cross-roads village. If we accept the implied invitation of the sign-board, and enter the grounds, other notices, conspicuously posted for our guidance, will be observed, and naturally we follow the pointing of one which directs to "The Serpent." A winding road leads to the summit of a broad plateau that, at present, is anything but park-like, for reasons to be mentioned later, but still every vestige of the former farm surroundings is wanting. The old worm fences, with their wealth of weeds, have been removed, and in their stead many small trees of different species have been recently planted. But the claim of the spot to be considered a park does not rest upon this small showing; finished pleasure grounds are not lacking, and a grove of oaks and maples, with both a sweet-water and a sulphur spring, is now available for picnic purposes, and, I may add, is well patronized.

Passing by both these finished and unfinished portions of the park, we proceed to "The Serpent," now lying directly before us. Upon a jutting tongue of level land, that reaches into, and one hundred feet above, the beautiful Brush Creek valley, rests that mysterious earth-work of an unknown people—a serpent, fourteen hundred feet in length, with closely coiled tail, gracefully curved body, and widely gaping jaws. Beautiful as it is in itself, our interest steadily increases as we look upon it, from the fact that it antedates all history. Since its discovery and description by Squier and Davis, in 1847, the spot has been often written of, and more theories have been broached concerning its age and origin than there are curves in its tortuous length. This has not been to the advancement of American archæology directly, but it has led to the purchase and preservation of the mound by the Peabody Museum of American Archæology and Ethnology, of Cambridge; and now it is not only available for all future students of ancient America, but its surroundings, some seventy acres, have been set apart as a public park, and so are of interest to the readers of Garden and Forest.

I have spoken of the unpark-like condition of the high plateau, through which the main drive passes. The present disturbed condition arises from the fact that every inch of the ground is being carefully explored for traces of the serpent builders, and the results so far go towards the establishment of the view that the people who erected the earth-work were not historic Indians—Cherokee or Shawnee, as has been asserted—but a race akin to, if not identical with, the ancient Mexicans. But I will not further trespass upon the work nor anticipate the conclusions of Professor Putnam, who is

conducting these explorations in a thorough and able manner.

The setting apart of a considerable tract in the midst of a rich farming district, as a public park, in connection with the preservation of this invaluable relic of the past, was a most happy thought; and additional educational interest centres in it from the fact that Professor Putnam has established here an arboretum on a limited scale, by having planted specimens of the many trees native to the region, thus returning it to the conditions obtaining previous to the advent of the white man.

As years roll by, this beautiful spot will undoubtedly become more and more attractive, and the wisdom of the establishment of the Serpent Mound Park will be universally acknowledged. Let us hope, therefore, that the efforts now being made to preserve other equally interesting traces of a forgotten people, in Ohio, may be likewise successful, and not one but several such parks be the boast of the people of this thrifty State.

Serpent Mound Park, Ohio. *Charles C. Abbott.*

English Flower Gardens.

IT is pleasing to see the increasing love and extended cultivation of hardy flowers, but the improvement of English flower gardens by their use proceeds very slowly. In many places the flower garden is still sacrificed to bedding out and presents the same meagre assortment of plants, the natural consequence being that in summer English flower gardens have great similarity of aspect, with few features of real interest. Each season brings the same monotonous form, with perhaps a little variation of style.

Pattern gardening was and is the greatest enemy to both gardeners and gardens; to gardeners, because, owing to the lack of material that would readily lend itself to this, many present-day gardeners are under the idea that beautiful flower beds cannot be made with hardy flowers; to gardens, because, in all situations and on different soils, each of which is capable of supporting some distinct types of vegetation peculiar to itself, the same subjects have been used. Hence the ultimate outcome, formality and sameness. We do not meet with so many of the complicated carpet enormities as in former days, but there is still room for vast improvement. It is too much to expect owners of gardens to undertake the work, although there are a few exceptional cases where this has already been done. Nevertheless, there are plenty of people who think and admire, and, without a doubt would appreciate a change which tended towards the improved embellishment of flower gardens by the use of an increased variety of hardy plants. Before this can be done a much wider knowledge of plant life will be needed. We want originality and the capacity to evolve new ideas. It is the lack of knowledge of the inexhaustible resources of Nature that is the root of the evil; and how can it be otherwise while young gardeners are trained under glass alone, and are scarcely brought into contact with hardy flowers, trees or shrubs?

A judicious and proper selection is of great importance. A few beautiful bedded-out gardens have been made, against which little reproach could be urged, but they have been carefully planted, and they have been beautified with a greater variety of summer garden plants. The mass of flower and gorgeous color has been toned down by graceful foliage and refreshing greenery. To one beautiful garden of this kind there are hundreds sacrificed to about half a dozen subjects, that were grown twenty years ago and are still grown now. During the present summer I was shown over a place which had the reputation of being fairly good, and after having walked around the flower garden and been asked to admire the usual scarlet, yellow and blue monotony, I found only one feature of real interest, and that in the kitchen garden mixed border. It was a large group, covering several square yards, of a very fine form of the white *Campanula Persicifolia*. The distant effect was very charming. The flower garden is the true home for all such flowers as this, and many more might be easily selected.

The beautiful garden of the future will be adorned with hardy flowers planted in open natural groups instead of the old dot-a-plant-everywhere system, that rendered the mixed border so unsatisfactory, and did not give a true idea of the capabilities of many of the subjects planted therein. An ideal English garden should have beautiful flowers for at least nine months out of twelve. We want lasting interest, a garden with vegetation that changes with the seasons, but is not defined by them. Week by week, month by month, some fresh charm should appear, some new picture unfold to view. The garden of hardy flowers is equal to this.—*The Garden*, London.

Foreign Correspondence.

London Letter.

THE Oleander (*Nerium Oleander*) is now among the glories of southern gardens, especially in Italy. The other day I strolled through one of the famous gardens on the banks of Lake Como, and in that paradise of flower and fruit nothing delighted me more than the large Oleanders, covered with blossoms as large and as double as Camellias. I had never before seen this plant in perfection, for it cuts a poor figure in English gardens. We cannot give it the roasting sun-heat and cloudless skies that seem so necessary to its perfect growth, but I believe that in the United States it would flourish as it does in Italy, since you could give it the summer-heat it wants, and its protection in winter, when grown in portable tubs, is not a great undertaking. Of some dozen distinct sorts seen in Italy the difference consists mainly in the color of the flowers. Besides the deep rose-pink, which is common everywhere, I saw a variety with pure white single flowers, one with flowers double white, a double deep red called Splendens, a double rose, a large single, copper-colored (*Cupreatum*), a pale yellow, double and single, and a very rich rose-purple named Professor Duchartre. Other unnamed varieties were quite as fine. On inquiry I found that the bushes received little or no attention. They were for the most part in large square tubs, and all looked as if they had been undisturbed for years. Each season a slight top-dressing of manure and soil was given, more to fill up the tubs than to benefit the plants, and all the attention given was frequent watering, the Oleander being a very thirsty plant. In some places the tubs are put under shelter in cold weather.

The Shrubby Mallow, as *Hibiscus Syriacus* is commonly called in English gardens, is one of the few hardy shrubs at present in bloom, and very attractive it is when in flourishing condition. To do well it must have a deep, moist soil, the richer the better, and if, in addition to this, it is sheltered and partially shaded, then it is a beautiful shrub in autumn. There are now a multitude of varieties in our gardens, most of them with very uncouth names, and many of French origin. There is, however, a great sameness in the majority of the sorts, the prevailing color being a kind of purplish rose, with crimson centre. In a large collection of sorts at Kew I singled out the following as the most distinct: Puniceus plenus, Rubro plenus, Alboplenus, Cœruleus plenus, Ardens and Duc de Brabant. In Mr. Anthony Waterer's nursery at Knap Hill there is a fine display of bloom, two of the finest sorts being Totus albus, a pure white variety, very beautiful, and Cœleste, which is the nearest approach to a true blue Hibiscus that has been obtained. The flowers are large, single and of a rich purple-blue, quite a different tint from that of any other sort. The great value of the Syrian Hibiscus lies in its autumn flower, and that is why it is always planted in English gardens, whether the conditions are suitable for it or not.

Lemoine's Hybrid Montbrietias are now found to be indispensable autumn flowers, being so graceful in growth, so profuse in flower, and so bright and rich in color. The first hybrid which came to us a few years ago, under the name of *M. crocosmiæflora*, was the result of intercrossing *M. Pottsii* (a Cape species, with wheat-ear-like spikes of small red and orange flowers), with the well-known old *Tritonia* (*Crocosma*) *aurea*, with large bright orange-red flowers. The hybrid combined the character of the parents in a remarkable way. Its flowers became larger than those of *M. Pottsii*, but quite as numerous, while the color was intermediate and more pleasing than that of either parent. It was, moreover, soon found to be much hardier than *T. aurea* and could be left out in the open border in winter like *M. Pottsii*. This original hybrid, *M. crocosmiæflora*, has now become a popular garden plant with us; in fact, is quite common, and especially as a pot plant in green-houses. Its sheaf of waving flower stems in August

and September makes it very beautiful, and as it continues in bloom for weeks, its value is enhanced. M. Lemoine, the famous hybridist of Nancy, has raised other hybrid Montbrietias, one of which I saw the other day in Mr. Wilson's garden at Weybridge, under name of Gerbe d'Or. It is like the older *M. crocosmiæflora*, except that the flowers are of a pure rich yellow, instead of orange-red, blotched with crimson. It is very beautiful, and though it has not come into general cultivation, it is certain to become popular, especially as a green-house plant.

Ixora Duffii.—Those who want a really fine stove plant for autumn flowering should become possessed of this evergreen shrub, introduced a few years ago from the South Sea Islands. In my opinion, it is the finest of all the Ixoras, for though it does not produce such a number of small flower clusters, its huge heads of bloom have an impressiveness which places it in advance of all others. A well grown plant is about four feet high, with large, deep green leaves, and it produces, at the extremity of each main shoot, an enormous cluster, often nine inches across, of deep scarlet-crimson flowers. It generally begins to flower early in August and lasts in bloom for several weeks. It is of simple culture under ordinary warm-stove treatment. It is grown to perfection at Kew in the Water Lily house, which is always moist and warm, and it has been the admiration of visitors for weeks past. It is a stock plant in nurseries and is known also by the name *T. macrothyrsa*. *W. Goldring.*

London, September 20th.

New or Little Known Plants.

Rhododendron (Azalea) arborescens.

THIS beautiful Azalea was first made known to botanists by Pursh, in his "Flora of North America," published in 1816. He had found it in the mountains of Pennsylvania, and in Bartram's garden at Philadelphia, where John Bartram, who was, therefore, its real discoverer, had planted it many years before. Neither the elder Michaux, who traversed over and over that part of the country where this species is most common, nor Fraser, who had explored the Alleghany Mountains some years before Pursh visited that region, seems to have noticed it, although it is hardly possible that they would have overlooked so common a plant, which they, perhaps, confounded with *R. vircosum*.

It is stated in Nicholson's "Dictionary of Gardening" that *Rhododendron arborescens* was introduced into English gardens in 1818, but it has probably never been very well known in Europe, and was soon lost, perhaps, from gardens. Our figure upon page 401 is, at any rate, the first which has been published of this plant, which, through the agency of the Arnold Arboretum, has been distributed within the last five or six years among many of the principal American and foreign collections.

Rhododendron arborescens is a tall shrub, with slender branches, sometimes fifteen or twenty feet high, and obovate or oblong-oblanceolate, slightly coriaceous leaves, ciliolate on the margins, bright green and shining on the upper and pale on the lower surface. The flowers are white or tinged with rose, the long, slender tube of the corolla, and the conspicuous, narrow calyx-lobes somewhat glandular bristly. The brilliant scarlet stamens and pistil add to the beauty of the deliciously fragrant flowers, which are not viscid like those of its nearest American relative, the familiar Swamp Honeysuckle (*R. viscosum*). They are later than those of other Azaleas, not appearing until July, and are often obscured by the shoots of the year which precede them, a habit which lessens somewhat the value of this species as a showy garden plant. The leaves, in drying, exhale the perfume of newly mown grass—a character which has not been noticed in other Azaleas.

Rhododendron arborescens is a native of the mountain region from Pennsylvania to South Carolina and Tennessee, where it is frequently found in great abundance, especially among the foot-hills of the high mountains of North Carolina, bordering and often overhanging the smaller streams and filling the woods in early summer with fragrance.

It is perfectly hardy in the Arboretum, where it receives no special treatment, and flowers freely every year.

C. S. S.

Cultural Department.

Winter Apples.

THE Baldwin is the most satisfactory winter Apple, as well as the most popular variety in this vicinity, and yet in the southern part of this state it is regarded as a fall Apple, and esteemed only as such. I confess its record for keeping qualities is not as good here as it was once, but its size, beauty, flavor, and fine bearing qualities render it a general favorite notwithstanding.

The universally popular Rhode Island Greening is still a great favorite, but it does not grow as smooth generally as the Baldwin. Neither does the tree grow as well. Its reputation as a keeper is also on the wane; and this will apply to all of our Apples once famous for long keeping. It was not unusual years ago for farmers to have a generous supply of Apples in April and May, a thing now very rare indeed. The cause or causes contributing to this changed condition give rise to much speculation, but no conclusion that is generally accepted has yet been reached. Possibly new varieties may be developed in the future that will occupy the positions in this respect once held by our old-time favorites.

Smith's Cider is a very popular winter Apple in Pennsylvania and southern New Jersey. The Apple is of fair size; the trees bear young, and when grown are immensely productive. The fruit is of fine quality and keeps well. It promises to do well in this section of the state.

One of the best winter Apples I am acquainted with is Peck's Pleasant. High-flavored, productive, and a good keeper, it very well fills the place once occupied by the famous Newtown Pippin, a variety long since superseded by others better adapted to our locality.

Northern Spy is also a fine, high-flavored winter Apple, but the tree is rather tardy in bearing, and the fruit is very liable to grow imperfect, and rots to such an extent as to impair its value.

Fallawater is a large Apple, a young and abundant bearer; very popular in some portions of Pennsylvania, but of late I hear complaints that the trees fail early. The fruit is not of first-rate quality.

Ben Davis, a popular Apple in the West, gives good promise here of early productiveness. The fruit is fair, handsome, of good size, and keeps well, but the quality of the fruit is far below that of the varieties already named.

Winesap, a beautiful red Apple, of excellent quality, of medium size, has proved one of the best keepers.

Yellow Bellflower is also a fine-looking and good-keeping winter sort. It seems among winter Apples what the Orange is among autumn ones, the chief objection to it being its large core.

Wagener stands near the head of all the winter Apples I am acquainted with for quality; of medium size, with a tender, crisp, fine-grained flesh.

In southern New Jersey the Roman Stem is a great favorite, an Apple the farmers always keep for their own use. At the Mount Holly Fair two years ago there were about fifty plates of this Apple on exhibition, entered for the prize offered for the best plate, which shows how extensively it is grown there. I am not aware of its trial in this section.

For a sweet winter Apple which is wanted for baking, Talman Sweet is probably as good as any; but the winter sweet Apple of this region is the old-time Canfield, the standard winter Apple of our fathers and grandfathers, a very prolific sort, and one that will stand more rough handling than any other. A bruise on the Canfield will dry up; on any other it will rot. This Apple still holds its place in the affections of the farmer, though it is a poor Apple for dessert or cooking. Its great merit is for cider. Its old-time consort, the Harrison, once so popular, and the richest of all Apples, has failed so completely of late years that a tree of it is a great rarity. Its present status affords a fit answer to the question, Do varieties run out or degenerate? These two Apples were the foundation in years gone by of New Jersey's well-earned reputation for "Newark cider," vast quantities of these Apples being crushed together and distributed widely through the Newark market. There was a cider-mill on every third or fourth farm, but nearly all of them long ago fell into decay.

I have only given the names of leading Apples of established

Fig. 64.—Rhododendron (Azalea) arborescens.—See page 400.

character and reputation. But besides these, and other less prominent ones, it is well to remember that every section has local varieties of real merit, especially adapted to their soils, and quite as profitable, if not of such fine quality, as any of the newer sorts. Many a good Apple has not been honored with book registry nor described by an official pomologist. These old and valuable varieties should not be neglected and allowed to disappear. Every man who owns an orchard or an Apple tree should know how to graft and bud, and see that these choice old-time varieties are not forever lost. The old Pom-

pey, or Victuals-and-Drink Apple, was a great favorite here years ago, and would be as welcome to-day as ever, but I do not know of a tree in existence in this neighborhood, and it is doubtful if it could be had in any nursery. Other varieties are disappearing in the same way, and the loss seems all the more annoying when it is easy with a few buds or grafts from one of these old trees to put a new head on a young tree and preserve the old friends. *E. Williams.*

Montclair, N. J.

The Flower Garden.

NOTWITHSTANDING the sharp frosts last week our garden still shows many bright flowers. The Meteor variety of the Pot Marigold, from summer sowings, is in capital bloom, and likely to last for a month to come. Sweet Alyssum is as white and fragrant as ever; so, too, would be the Mignonette were it not for the very wet September just passed. The double white Feverfew is in good bloom a second time, and Tritomas will remain in full glow till Thanksgiving. Half the crop of buds of the handsome Japanese Anemones have not yet opened. What a pity this plant is not earlier and hardier. *Sedum Sieboldii* is perfectly hardy here, and its best bloom is in October. Sweet Violets are beginning to bloom, and the Eschscholtzia will display its golden flowers till snow comes. Maximilian's Sunflower is the finest species of its race at this time of year.

Hardy herbaceous perennials may now be transplanted. Tuberous-rooted species, like the Pæonias, Liatris and Monkshood, may be planted now as well as in the spring, and early spring flowers, like Moss Pink, Aubrietia, *Saponaria ocymoides* and bulbous plants do better planted in fall than in spring. Columbines, in particular, do better when planted in the fall. But summer and fall blooming plants, like Veronicas, Phloxes, Helianthuses, Japanese Irises, White Day Lily and the like, should be planted in spring, especially if these plants are to be divided, with the view of increasing the stock or reducing the size of the parent clump. Somewhat tender plants, like Japanese Anemones, Conoclinum, Acanthus and *Œnothera speciosa*, should never be disturbed in fall except to be removed to a cold-frame or other favorable quarters. If they have any chance at all of surviving the winter, it is as established roots, and not as newly-planted stock.

Long Island. *G. C.*

Japanese Iris (Iris lævigata) from Seed.

ALTHOUGH this Iris may now be imported direct from Japan in a multitude of beautiful varieties, the raising of new ones from seed may be made profitable as well as interesting. When left to their natural development they produce but little seed, and the varieties obtained from this are ordinarily no better and usually not as good as the originals, but when carefully hand-fertilized nearly every flower so treated will produce its pod of seed, and a large percentage of the flowers will be better and most of them quite as good as the parents. By actual count it has been found that of seedlings from hand-fertilized flowers, forty per cent. were varieties worth preserving, while of plants from seed produced naturally but six per cent. were good. It is desirable to have some varieties to flower earlier in the season, and this may be accomplished by a careful selection of seed from those that first come into bloom. Already we have plants which begin to flower in the latter part of June, and we still had fresh flowers on the 10th of August. Few garden flowers can boast of a much longer period of bloom than this.

That the raising of seedlings is not only interesting to the amateur, but may be made profitable to the nurseryman, is quite evident from the quantity of seed produced, which will average, from well fertilized flowers, about fifty in each pod, and when properly treated the young plants will be large enough to flower the second year, and a large stock may be secured in this way with much less labor than it can by division. The process of hand-fertilization is quite simple after one has carefully studied the flower and located the essential organs. Upon examination, the Iris flower, in its normal form, will be found to be composed of nine distinct pieces or divisions, arranged in rows of three divisions each, one within the other. The two outer rows make up the six divisions of the perianth, the three outer are spreading or drooping and the three inner are smaller and stand erect. Inside of these again are three more divisions resembling somewhat the petals in form, but as close examination shows in reality the styles, with the stigmas near the apex in the form of a thin lip, the surface of which is covered with minute hairs. By pulling back the petal-like tips of these styles the lip-like stigmas will be readily seen. Lying close beneath the styles, but connected at the base by the short and stout filaments with the tube of the perianth, will be found the anthers, which are long, lance-shaped organs, with the pollen contained in narrow cells along their margins. Nature, in providing for cross-fertilization, has so arranged the flower that the pollen is ready for use and gone fully a day before the stigmas are in proper condition to receive it; in fact, the pollen is ready for use before the petals begin to unfold, and it is a wise plan for the operator, after deciding what pollen he wishes to use, to take the flowers just as soon as they begin to open and cut out the anthers with a sharp pointed pair of scissors or small penknife, lay them away in folded papers or envelopes, marked with the name of the variety from which they were taken, and keep them for future use; the pollen can be kept in perfect condition in this way for a week at least, and an abundance of pollen may thus be had when the stigmas are ready to receive it. This is an important precaution, for a very small native bee (a species of Halictus) is on hand as soon as the flower shows the smallest opening, and will have the anthers well cleaned of pollen by the time the flower is fully expanded. It would look as if the flower was made to be fertilized by the bumble-bee or some similar insect, but in this country, at least, the flowers are seldom visited by the larger bees, hence the scarcity of seed when the plant is left to itself. When the flower first opens, the stigma will be found closely folded back against the style; but by the second day the upper edge will have been detached, and falling downward, the upper surface will be exposed and is now ready to receive the pollen. A small camel's-hair brush will be found the most convenient instrument with which to apply the pollen, which is done by simply taking off a quantity with the tip of the brush and lightly dusting the upper surface of the stigma.

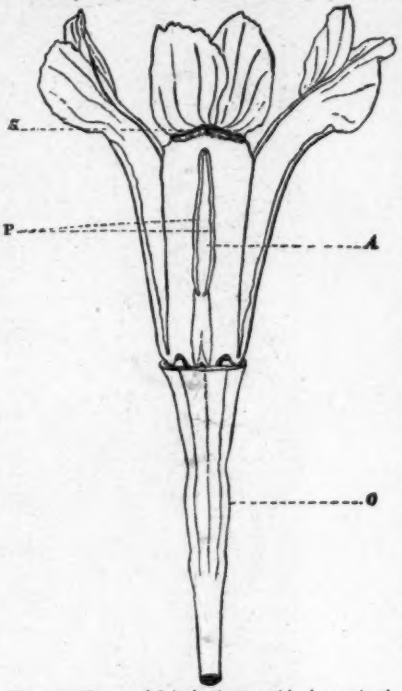

Fig. 65.—Flower of Iris lævigata, with the perianth removed. A, anther. P, pollen cells. O, ovary. S, stigma.

The figure represents a flower with the perianth cut away, showing the three styles, one of the stigmas (S) and one of the anthers (A).

The good effects of this fertilization will be noticeable very early, for not only is it apparent in the flower when produced, but the pods are usually much finer and larger than when accidentally fertilized. The seeds germinate quite freely if planted, as soon as ripe, in good soil and carefully watered. For soil in which to plant the seeds I prefer well decayed leaf-mould in shallow boxes, from which the young plants are transplanted to the open ground the following spring.

Newton, Mass. *Arthur H. Fewkes.*

Chrysanthemums.

WE grow these largely for cut flowers and for out-door decoration. They are raised from cuttings rooted in the green-house in spring and planted out in May, in well manured ground, in rows three feet apart by two and one-half feet apart in the row. In summer they are cultivated, watered now and then in very dry weather, and tied up with one stake to each plant. About the end of August or in September we select and pot the plants most desirable for furnishing good flowers and late ones in the green-house. Our largest supply

of flowers comes from out-door plants, but if wet, frosty or windy weather renders the out-door flowers unfit to pick, we have a supply in the green-house; also when severe frost destroys the out-door crop, as it usually does between the 20th and last of November, late green-house plants are then most welcome.

About the end of September or first of October we empty some beds—warm, sunny, sheltered beds against the south side of the house—of their tender summer occupants and fill them with Chrysanthemums, lifting and planting them with as good balls of earth to the roots as can be had and crowding the plants pretty closely against each other so as to form a solid bank. The Chrysanthemums not only live and blossom as well as if they had not been transplanted, but they lose very few leaves. As planting proceeds they are well watered, and they are afterwards kept well watered both at the root and overhead.

In another warm, sheltered place we set out, about the first of October, a large solid bank of Chrysanthemums containing several hundred plants for cut flowers. A light wooden framework is erected over this bank, and in the event of wet or frosty weather, calico cloth is spread over this frame. Here we can have fine flowers from the end of October till the first of December.

Raising Chrysanthemums from seed is very pleasant work. During the last five years we have raised hundreds in this way and nearly all have been beautiful. The majority have single flowers, still a large number have semi-double or double flowers, and of many shades of white, yellow and red. But of all these hundreds of seedlings only three have been worth perpetuating. The amount of rubbish annually distributed among new Chrysanthemums is simply appalling. Of sixty-two new kinds we bought last year we have thrown fifty away, as being not only poorer than old varieties of the same types and colors, but not worth growing. We greatly feel the need of some centrally situated, competent and responsible body of horticulturists to whom new Chrysanthemums and other flowers could be submitted for their opinion; such a body as the Floral Committee of the Royal Horticultural Society of London. A first-class certificate from such a body would mean something. In fact, even here in America, horticulturists regard a first-class certificate by the Royal Horticultural Society as the highest award a plant can have, and we buy such a plant with full confidence that we are getting something distinct from anything else in its way and also something well worth growing.

Chrysanthemum seeds germinate in seven to nine days and the plants grow readily. Sown in the house in March, the plants will be big enough to set out in May, and they will attain a large size during summer. They will show flower buds in September, and all will bloom in October or November of the same year. We have now 150 plants in one bed which have been raised from seeds sown last spring. They are larger than the named varieties which have been raised from cuttings; all are now full of buds, and in form and foliage they are distinct from one another.

Glen Cove, N. Y. *William Falconer.*

View in the "Arizona Garden," Monterey.—See page 398.

The Cultivation of Phalænopsis.

IT would be a great mistake to class all the Phalænopsis with the easy-growing Orchids, as there are several which I have never yet seen in a luxuriant condition. Nevertheless, some of the species are amongst the finest Orchids known. They all flower freely, and continue a long time in perfection. I never found any difficulty in cultivating *P. amabilis*, *P. amethystina*, *P. Esmeralda*, *P. grandiflora*, *P. intermedia*, *P. leucorrhoda*, *P. rosea*, *P. Sanderiana*, *P. Schilleriana*, *P. Stuartiana* or *P. violacea*. Of *P. Schilleriana* I have many leaves made this season which measure from fourteen to eighteen inches long and from three and a half to four and a half inches wide, and I am justified in expecting some very strong spikes of flowers.

The species of Phalænopsis are best grown in baskets, as a more equal supply of moisture can thus be supplied to the roots. I always re-moss them in April or May, and re-basket any that require it. Every precaution is taken with the heart of the plant to have it leaning over the edge of the basket, so as to prevent any drip from entering, as decay is pretty sure to result. When the plants are re-mossed all decayed matter should be removed, and clean potsherds, with large pieces of charcoal, should be returned. A large piece of charcoal, so placed as to protrude through the moss, is beneficial. The roots will cling to it tightly, showing their relish for it.

Phalænopsis cannot endure a low, narrow house. They must be close to the glass; but all other conditions being provided for, the more spacious the apartment, the better they will thrive. I take my largest specimens and hang them in the south end, where they will get the benefit of the light and warmth from the sun. They get a syringing underneath the baskets every bright morning in order to thoroughly moisten the roots, and they need enough water to keep the sphagnum moist, but not saturated. Syringing the leaves is a great mistake, as it tends to make them soft, so that they lack that

leathery appearance which gives promise of the strongest bloom. As a rule, the plants are over-watered at the root, while too little moisture is given in the air. The flower-spikes should always be supported in some way, for if allowed to sway to and fro they will probably break many roots and loosen the plants.

I have found water charged with fertilizing ingredients, such as ammonia, salt, guano or phosphates, very beneficial when applied a few weeks after the baskets have been re-mossed. Every care should be taken in ventilating, as Phalænopsis will not endure chilly air. Fresh air should be admitted by the ground ventilators, especially in windy weather.

Shading should be carefully attended to, as the burning rays of the sun would soon destroy them when the leaves are young and unaccustomed to its heat. They should always be kept perfectly free from insects, and if thrips appear a slight fumigation with tobacco will be needed. The night temperature of the house, from the 1st of November until the 1st of May, should be 60°; during May and October it may be 65°, and during the summer it should be kept at about 70°. The day temperature should range from five to ten degrees higher, according to the force of the sun. *F. Atkins.*

Staatsburg-on-the-Hudson, N. Y.

A Few Choice Ferns.

WITHIN the last few years a large number of beautiful Ferns have been introduced, many of them useful for cutting, and a few unexcelled for basket culture. The cultivation of Ferns is becoming more and more an important branch of horticulture, and a few commercial establishments have already confined themselves almost entirely to these plants. The old and justly popular kinds will always take the lead for general trade purposes; for finer work, and especially for conservatory decoration, the newer kinds will always be sought for. One of the latest introductions, and the best in its class, is *Nephrodium rufescens tripinnatifida*, a large fern with fronds about four feet long, arching, wavy in outline, the pinnæ being very irregularly divided, light green, and covered on both sides with a reddish chaff. The stipes are reddish-brown and covered with a woolly coat of the same color, and the general appearance of the fronds gives one the impression of ostrich plumes. This plant is suitable for baskets, and makes a magnificent pot-fern; and for cutting purposes, where large fronds are needed, it is excellent. It thrives in a warm green-house, growing rapidly in rich, well drained soil, and requires an abundance of water. It is troubled at times with a soft scale, which may be prevented by constant syringing. It increases freely by the adventitious buds on its numerous stolons, which may be taken off as soon as they are able to take care of themselves.

Davallia tenuifolia Veitchii is an elegant fern and admirably adapted for basket culture. The fronds spring thickly from a creeping, wiry rhizome, and are about eighteen inches high, arching, with the pinnæ very finely divided, giving to the plant an airiness quite unrivaled. In color the fronds are pale green, while the stipes have a reddish tinge. It grows freely in an intermediate temperature, in a light compost composed mostly of peat. It should never be allowed to become dry; it is easily propagated by division of rhizome or by spores.

Grymnogramma schizophylla belongs to the silver Ferns, and is vasiform in habit, with very finely divided, drooping fronds. It is one of the most graceful of the whole genus. It is recommended for basket-work, but does best with us in pots. This may be owing to the damp shelf on which the pots stand. The fronds are proliferous, and the young plants may be taken off, pegged in pots of sand and watered lightly until root action is well advanced. If these young plants are not needed, the beauty of the plant is much enhanced by leaving them on. The variety Gloriosa is much more vigorous than the last named, the fronds are longer, broader, but not so finely divided. Both kinds delight in abundance of heat and water, but if the foliage is wet too much the farinose powder will soon be washed off. A large proportion of loam in the soil will be found beneficial.

Among the new Maiden-hair Ferns, *Adiantum Williamsi* is probably the best. It is a strong-growing kind, with fronds about two feet long, which while young are covered with a yellow dust. It grows freely in an intermediate temperature, and will very quickly grow into large specimens. The mature fronds are good for cutting. A strong soil will be found best, especially when permanent specimens are required, and liberal applications of manure water are beneficial.

Adiantum Victoriæ is a valuable addition to the dwarf-growing section. The fronds are about nine inches in height, with few pinnæ, and the pinnules are large, with finely serrated edges. The general appearance of the plant is that of a dwarf *A. Farleyense*. It should be noted that to keep this Fern in good health it should be often broken up. The fronds grow so thickly together that large specimens are apt to rot at the centre.

Adiantum Pecottii is a charming little plant, about six inches high, much in the way of *A. bellum*, and, like this fine species, will be found very useful for general decorative work.

Among the many varieties of *Adiantum cuneatum* that named Grandiceps is one of the best. In this Fern the fronds are terminated by a tassel-like appendage caused by the fasciation of the terminal pinnæ. It is a splendid kind for baskets, and young plants in pots will be found superior to the species. It may be raised and will come true from spores.

Adiantum Weigandii, of American origin, is a handsome, robust species, which can be grown both in a warm and a cool temperature, and will prove an excellent kind where heavy foliage is needed.

Nephrodium Rodigasianum.—This is a very elegant Fern of vasiform habit, with broad, arching fronds, two to three feet long, of dark green color. The pinnæ are long, deeply and irregularly cut, with somewhat wavy edges. It has decided preference for a cool house; and requires liberal treatment in respect to soil and water. It grows rapidly, and is easily raised from spores. Unfortunately, the fronds are too brittle to be of any use for cutting. *F. Goldring.*

Kenwood, N. Y.

Removing Raspberry Canes.—It is still debated whether this should be done soon after the fruit is gathered or left till later in the season. I have for years cut them as soon as convenient, after the berries are picked. My reasons for an early cutting of the old canes are that, having served their purpose, they are of no further use, and if allowed to ripen and mature till a natural death follows, they are a useless drain upon the soil and the vitality of the plant. If removed, the young canes receive all the nourishment furnished by the roots, and should be better developed and matured as a consequence. It is also easier to cut off the canes while still green than when dry and dead. Hand-shears are preferable to a knife, avoiding the pull, which sometimes lifts the whole plant, when the canes are hard and dry.

The opponents of early removal claim that these old canes are an aid to the maturity and development of the young canes; that it is Nature's way, and therefore right. It is also claimed that if left till spring they afford needed protection during the winter to the young canes. There is a show of reason in the protection theory, but as the injury is very apt to occur in early spring, after the old canes are removed, the benefit becomes less apparent, and is more than counterbalanced by the draught on the plant in the process of ripening. The above remarks will apply also to Blackberries, the worst of all the berry canes to handle.

Geraniums, Crane's-Bills.—These include some useful border and rock-garden plants. All the kinds in cultivation, with one or two exceptions, are hardy in this country. The alpine species will require good drainage, but the others will grow almost anywhere. Geraniums have a long flowering season, and bloom more or less from early May until frost. This is the case, particularly, with *G. sanguineum*. Plants are easily raised from seeds or root-cuttings, and they hybridize freely. The best alpine kinds are *G. argentum*, with silvery foliage, and pinkish flowers with darker veins; *G. cinereum*, resembling the preceding, except in having greener foliage and darker flowers; *G. macrorhizon*, with purple flowers and a woody root-stock; *G. sanguineum*, a trailing species, with pretty blood-red flowers and blooming from spring till fall. This plant always looks neat and is very easy to grow. Its variety, Lancastriense, is equally handsome, with pink flowers and darker veins.

Amongst the border Geraniums are some very handsome ones. *G. collinum*, purple; *G. Ibericum*, blue; *G. Ibericum palatypetalum*, violet and veined; *G. phœum*, very dark blue, with a white spot at the base of each petal; and *G. pratense*, notably the double blue and single white forms—all bloom in spring, and make a considerable display while they last, and again in the fall, though not so abundantly. *G. Endressii*, rose, one of the best and very useful for cutting; and *G. Armenium*, one of the noblest of all, growing sometimes four feet high, with dark crimson flowers, bloom all the season. The common *Geranium maculatum* grows in swamps, and on dry banks as well, though less luxuriantly. *T. D. Hatfield.*

Wellesley, Mass.

The Forest.

Forestry in California.—IV.

The effect of forests on rainfall is not as yet sufficiently determined. The total rainfall of the world would, perhaps, be no less were forests not in existence, but it seems to me that an examination of the subject must lead us to conclude that the distribution of the rainfall is affected by them.

Forests continually operate to equalize temperature. The capacity doubles with a mean increase of °23.4 between the freezing point and 100 degrees fahr. Thus in the spring and summer the cooling effects of forests on temperature must diminish the water-holding power of the air. In walking or riding, every one must have noticed the difference in heat between a bare verdureless spot and the shade of trees. This difference is observable even in walking from a dusty road to a grass-covered lawn, thus indicating that the variations of temperature do not depend upon the shade alone. Consequently a current of air saturated for a sandy waste would of necessity, in passing through a forest, part with some of its humidity, owing to the lower temperature. It is for this reason that we see clouds gathered about mountains, when the valleys are under a clear sky.

I have often sat upon the sandy coast of Egypt and watched the sea breeze, full of clouds seaward, clear itself on reaching the coast: all the atmosphere over the water fleeced with clouds, while to landward all was sunshine. Our own coast breezes show the same phenomena; the foggy winds of San Francisco soon become the clear breezes of Sacramento, because the temperature of the latter will not permit the moisture to remain condensed.

I have records of many observations made in our Central States showing that the summer rains are more frequent in wooded districts, and usually follow timber belts and water courses.

There are also a number of observations on record showing that the electrical effect of trees may play an important part in rainfall. Trees attract electrical discharges, as is known in the case of lightning, and coupling this fact with an experiment made with a collander so fine that water merely oozed through, from which, on the application of an electrical current, the water poured out of the small apertures; we must conclude that the effect of trees on rainfall through electricity may be considerable.

Whatever the effects of forests may be on the amount of rainfall, it is beyond doubt that their influence on its delivery is of the first importance.

Trees offer innumerable obstacles to the running off of rain. Their foliage obstructs the force of the rainfall; when this reaches the ground it is impeded by the fallen twigs, leaves and the labyrinth of roots and the humus; by the latter it is rapidly absorbed and held as in a sponge. The roots, at least when decayed, form channels into the lower soil. These impediments cause the water to flow very slowly, and prevent it from gullying out the land and forming accumulative channels. Thus the rain has time to sink into the earth and to replenish the subterranean reservoirs of the springs. The waters percolating out of forests never carry earth in them, as is the case on lands denuded of vegetation. The rate of delivery of a given rainfall from a wooded water-shed is much slower and is much longer continued than from a bare one. The importance of this will be understood when we recall the French experiments at St. Phalaz. At that place there are two water-sheds of nearly equal area and inclination; the one wooded, the other not. From the first proceeds a nearly perennial stream, from the other a dry gully. The period of delivery of flood waters in the first is five days, while in the second the period is only six hours, and it is but fair to presume from the stream in the wooded one that it is a delivery of water that months before fell in rain, which amount of water falling upon the other water-shed augmented its flood.

The first of these water-sheds causes no destruction to the roads nor extensive erosions of the banks of the stream, while the floods from the other wash away the bridges, destroy the roads and roll gravel and boulders into the valley.

Supposing ten billion gallons of water to fall within a given time upon each of these water-sheds. From the first the delivery will extend over a period of five days, or 120 hours, some of it being permanently retained to supply the springs and stream; while from the other the ten billion gallons will flow off in six hours with scarcely any absorption into the soil itself, consequently the delivery of water during a given moment during the flood must be twenty times greater in the denuded ravine. Every second of prolongation of water delivery diminishes its height, force and danger.

It is in denuded and mountainous water-sheds that torrents are formed. The undetained waters rapidly form channels and erode the land, carrying earth, sand, gravel and boulders in their flow. As the inclination of water-sheds diminishes, the débris is dropped, first the boulders, then the gravel, then the sand, and last the earth and clay.

Standing upon the dykes of the Talfer torrent at Botzen, in the Austrian Alps, I observed the dry bed of the stream to be on a level with the roofs of the three-story houses at Schlanders, Kortsch and Lais; the church steeples are lower than the bed of the Gadribach. The water-shed of the Durance, in France, was formerly wooded, as we know by the records of the lumbering corporations that operated upon it. For years it has been denuded, and the river now varies from a vast bed of pebbles and sand to a furious torrent. It has covered more than two hundred thousand (200,000) acres of one of the formerly most fertile valleys of Provence.

In Southern California the same causes are already producing the same results. Fires have been set and are being set by sheep men, which burn the brush and forest and prevent new growth. New torrents in unexpected places have formed, and the old channels, such as the Tejunga, Santa Clara, San Gabriel, etc., are more subject to floods than formerly with the same rainfall.

When we contemplate what has happened in other countries, we cannot but perceive that the mining débris of our central valleys is nothing to what must be expected from torrential action from such a chain of mountains as the Sierra Nevada, with its easily disintegrated formation, should it be denuded of vegetation, and the snows be unprotected and the rains undetained.

The principal sources of danger to be anticipated in this direction are the fires which annually do more and more damage, and the over-pasturage of the mountains, which packs the earth, destroys the humus, and, through the hunger of the half-starved sheep, causes the destruction of the natural reproductive power of the forests by reason of the eating by these animals of the young trees. As has been said, it cannot be doubted that the sheep-men in our mountains do every year a hundred times more damage to the lumber, to the streams and springs, and to the retentive power of the water-sheds than the scanty mountain pastures are worth. Sheep-pasturage should be regulated as it is in Europe and confined to particular forest tracts with such limitations as the condition of the forests requires. In this way the mountain pastures could carry more sheep than now, for under the present system both forests and pastures are being destroyed.

The secondary effect of denudation of mountains and the consequent formation of torrents is the diminution of springs and streams in their summer flow. The rains rushing off rapidly have no time to sink into the subterranean reservoirs, and consequently the springs must fail.

Col. H. H. Markham, a Congressman from Southern California, who introduced the Forestry Bill prepared by the California Board into the last Congress, in a letter to me, says:

"I was born, raised, and have always lived in a timbered "country, and have watched the effect of timber upon natural "water courses, and I am thereby fortified in my belief that "your position is correct. My brother owns a farm in She- "boygan County, Wisconsin, a county heavily timbered. He "built a single mill on the creek passing through his farm and "ran it by water-power, but as the land surrounding him be- "came shorn of its timber and cultivated, the stream dimin- "ished and soon became dry. He sold and purchased another "tract in the next county north, and when I first saw it, in "1861, there was a stream running through it containing suf- "ficient water to allow him and others to float double length "railroad ties by the hundreds down it to the market. The "surrounding country was rapidly cleared, and within six "years the stream became dry, with no water, except in rainy "seasons."

California uses much water in irrigation, and in the south pays high for the fluid for domestic use. The value of water here, already considerable, must increase with the population. Consequently it is of vital importance to preserve at least the present capacity of the mountain water-sheds, to retard the melting snow and the delivery of rainfall, so that torrents shall not form to destroy the valley lands, and the springs and streams be maintained.

The State of California has no practical forest-system, neither has the Federal Government. The forest lands of the state in private hands are beyond the control of the State Board of Forestry, and the State School-lands and Government-lands in

forests are common to all for entry, pasturage, etc. No forest officer has any control over them, except to arrest for setting fires in the woods, and even in this the circumstances are so adverse to fixing the responsibility for these fires, that, with the utmost efforts, few arrests can be made, and fewer convictions had.

The state sells its land without any reference to the timber upon it. Practically all the school-lands in timber in California are mountainous, and are unsuited to agriculture. Where timber-land is bought in this state the timber is all that it is bought for, and after this is cut it is usually abandoned for taxes, if, happily, all the school payments due the state have been made. On the school-timber sections, in many cases, wood and lumber has hitherto been taken without so much as a by-your-leave from any one.

This Board is, as far as we know, the first official body to ask for an accounting for the school from the wealthy firms who have taken such timber. We have a special agent and assistants now in the field collecting evidence in these and other forestry cases by affidavits. The amount of money involved is very considerable, and belongs to the schools. We are obliged to proceed through the Attorney-General of the state, and hope to secure his co-operation in our work.

The United States land-system only allows a man to acquire 160 acres of forest-land. This is far too little to warrant the building of a modern saw-mill, consequently lumbermen have either cut timber without title to the lands, or used "dummies" to obtain by fraud and perjury what they required. There are doubtless cases in which lumbermen have good titles.

The government has for some time had special agents on the coast to secure evidence against illegal cutters of timber. These officers now have a great number of cases on hand, for the practice of robbing the government lands has been general. One case, that of the United States *vs.* The Sierra Lumber Company, for $2,000,000 worth of stolen timber, is now on trial, and another involving 600 fraudulent land entries in Mendocino County, in the interest of one foreign firm, is before the courts. These are the leading cases of each kind. These lands are almost all worthless except for the timber on them.

At present there is no management over pasturage here. Robbed and burned everywhere. This is our forest-land system. A few special agents report, a prosecution or two is started, but the government attorneys, from some cause, bring few to trial. Fraud and illegality is at a premium in the lumber industry, and the honest man can hardly tell what to do in it to live and follow the law. Such a system, with such results, must be bad. A vast property is being squandered, the country endangered, and the citizens tempted to violate the law.

What the timbermen want is the timber, not the land. What the people in general need is that the water-holding power of the mountains shall be preserved. A sensible forest-system can sell the timber, while preserving the reproductive power of the forests and the forest itself as to its water-holding capacity, just as is now done in South Australia, India and in Europe. The forest-land ought not to be sold; not another foot of it should be sold by the state or by the federal government.

Santa Barbara, Cal. *Abbot Kinney.*

Correspondence.

Hardy Trees.

THE introduction of ornamental trees from Japan during the last ten or fifteen years has claimed so much attention, that it is a matter of interest to determine what limitations of growth are imposed by the often severe climate of the northern United States and Canada. In the vicinity of Montreal the species specially worthy of note at this time are *Ginkgo biloba, Circidiphyllum Japonicum, Actinidia polygama* and *Paulownia imperialis*. With the exception of Actinidia, these are all growing in the grounds of McGill University. The situation is directly at the foot of the Mount Royal slope, and opens out on the east, but is well sheltered on the west. The adjacent buildings afford a somewhat additional shelter on the south, while the surrounding trees seem to break the force of the wind from all quarters.

In October, 1881, a Ginkgo was brought from Rochester. For a few years the growth was slow, but it has gained steadily. After eight summers and seven winters the tree now shows an increased strength, which promises well for its future growth, and gives assurance of its probable hardiness. Although the rate of growth has probably been much slower than in its native country, the tree has attained a height of fourteen feet six inches, with a girth of seven inches at one foot from the ground. During the past summer the main shoot made a growth of four feet four inches—much in excess of the growth of former years.

A second specimen, received from Mr. Charles Gibb, from a locality about forty miles south-east from Montreal, was set in May, 1884, and has now attained a height of seven feet six inches and a circumference of 3.25 inches at one foot from the ground. In each of these cases there has been no winter-killing, and the trees appear to be well established.

The Circidiphyllum was planted in May, 1882. In seven seasons of growth it has reached a height of twelve feet four inches, and a girth of seven and a half inches at one foot from the ground. In this case, also, there has been no winter-killing, and the tree appears well established and hardy.

The Paulownia was planted in October, 1881. The stems have been killed to the ground each year, but the growth of each season has proved larger than that of the preceding, and this year reached a height of ten feet. The roots, which are quite hardy, appear to be gaining strength each year, and the plant is quite as well established as the one growing in the Botanic Garden at Cambridge.

The Actinidia referred to was imported from Amherst, Massachusetts, three years ago, and planted by Mr. Gibb at Abbotsford. The situation is at the foot of Tamaska Mountain, having a south-eastern aspect. The soil is an open gravel. A slow growth the first year has been followed by a luxuriant growth for the last two seasons, and there is every reason to consider the plant quite hardy.

These facts may derive additional interest from the following considerations:

Montreal is situated in north latitude 45° 30′ 17″, and as shown by the records of the College Observatory, based upon observations for the last thirteen years, the mean annual temperature is 41.72° F.; relative humidity, 74.3; rainfall, 26.90 inches; and snowfall, 125.3 inches. The lowest temperature recorded since 1880 was −26° F., which occurred in the years 1882 and 1887. It will thus be noted that all of the plants under consideration have, once at least, been brought under the influence of a temperature many degrees below that to which they are subjected in their native country.

Paulownia is a species essentially belonging to central and southern Japan, and therefore to a much lower latitude than this. Ginkgo is common throughout the empire with the exception of Yeso, where it is rarely seen in the southern extremity. It may be regarded as not extending above the forty-first parallel. Circidiphyllum is abundant through northern Yeddo, and is everywhere found in the woods among the foot-hills of Yeso. Actinidia also abounds in the same region, so that both of these species extend northward to the latitude of Montreal. Yet it must be borne in mind that the insular climate of Japan, even so far north as 45°, is much less severe and far more equable than here, while the snowfall is practically the same—the meteorological records for Sapporo, latitude 43° 3′ 57″ N., for the last six years, giving a mean of 156 inches.

Montreal, October 1st, 1888. *D. P. Penhallow.*

Ostrowskya magnifica.

To the Editor of Garden and Forest:

Sir.—Allow me to correct, for the sake of history, a slight error in one of your late London Letters. This plant flowered for the first time in Europe in 1887, in my little garden at Baden-Baden, from whence the big plants have passed into the hands of Messrs. Veitch & Sons. It is as hardy as any weed, and, though pushing early, the young shoots are not harmed by frost; it is not particular as to soil, but prefers sandy loam, which in any case must be deeply worked, as the root, when reaching full size, descends to a depth of two feet in the ground. Great care must be taken in handling the roots, because they are exceedingly brittle and a rough touch may cause them to decay.

Baden-Baden. *Max Leichtlin.*

To the Editor of Garden and Forest:

Sir.—Is there any better way to rid squash vines of those ugly white worms than to hunt for them and destroy them? My gardener says that if the seeds were planted later the worms would not trouble them. But, in that case, we run the risk of the frost, which caught my vines this year before the squashes were ripe. What shall I do—take the chances of frost, or fight? *A. W.*

Concord, Mass.

[Plant when the ground is warm enough, say the middle of May, and cover the hills with boxes over which mosquito netting has been tacked. Leave the boxes on

until the leaves begin to crowd the netting, then remove them and place among the plants corn cobs dipped in coal tar. Do not allow the tar to touch the plants. Redip the cobs once a month until the middle of September. This treatment will ward off all foes except, perhaps, the Squash bug (*Anasa tristis*), and this is rarely so abundant as to work much harm.—Ed.]

To the Editor of Garden and Forest:

Sir.—I am inclosing a portion of my piazza for a conservatory. The sashes are so arranged that they can be taken away in the spring. The exposure of this conservatory will be south-east and one of the house chimneys passes up through it. I write to inquire about the best method of heating in an inexpensive manner. Is there any small stove made that I can use which will be fairly free from the escape of gas, and with some provision for the evaporation of water, that the heat may not be too dry? *P. B. J.*

New York, July 26th, 1888.

[It is not practicable to satisfactorily heat a conservatory with a stove or without hot water or steam pipes. Hitchings & Co., of this city, make a base-burner boiler which is efficient for small work and economical. It heats hot water pipes, and the plan of putting them in should be entrusted to the maker of the boiler or some capable engineer.

There is also a heater much used for warming brooders in Hammonton, N. J., where many young chickens are raised in the winter. It is the plan there to introduce fresh air warmed by passing over pipes of hot water. The apparatus is simple and inexpensive, and would, no doubt, answer the purpose of our correspondent. It is manufactured by Bramhall, Deane & Co., of this city.—Ed.]

To the Editor of Garden and Forest:

Sir.—I was at Charlestown, New Hampshire, during the summer, and saw growing Alfalfa, forty pounds of the seed of which had been sent from Colorado and planted there. It had been cut once, and was ready to cut again, and would probably yield five tons or more to the acre during the season. As is well known, it is a very valuable crop for cattle, sheep and hogs in California, and planted on rich, damp land gives large returns. I am told it could be used to great advantage for ensilage, and would like to inquire through your journal why it is not generally grown in the Middle States and parts of New England?

Boston, Mass. *Franklin Hunt.*

[Crops of Alfalfa larger than that reported by our correspondent are not rare in the Middle and New England States. At the New York Experiment Station it starts well, does not winter kill, gives two, and even three good crops a year, thrives on the heaviest soil and endures drought admirably. The New Jersey Station reports that Alfalfa can be cut three or four times a year for five or six years in succession, yielding as heavy a crop per acre as fodder Corn. A gentleman near Boston writes that he cannot dispense with it as a soiling crop. And yet, for some reason, the use of Lucerne has never become general, although it was successfully cultivated nearly 100 years ago in the Middle States. The fact is that it very often fails. At a farmers' meeting in Schenectady last spring, Colonel F. D. Curtis replied to some one who marveled that this plant was so generally neglected by saying, that once in about twenty years agricultural writers unite to commend Lucerne and quote many instances of success. But the fact that the plant soon drops out of notice again is proof that it lacks some quality essential in a first-class forage plant. Secretary Guld, of Connecticut, says that repeated trials have been made with Lucerne in that state, but they have all resulted in failure. Still, the occasional successes are so striking that the plant is worth trying in a small way on every farm. Some authorities hold that an open, porous subsoil is essential to the best growth of this plant, which roots very deeply. The complaint is often made that a good "catch" of seed cannot be secured. But this could be remedied by care in preparing a well pulverized but compact seed-bed. It is often sown broadcast, but the young plants are small and feeble, and easily smothered by weeds. The seed should, therefore, be sown in drills that are far enough apart to admit cultivation between the rows until the plants are established. Probably a lack of cultivation and sowing the seed on a soil that rests upon an impervious hard pan, are the most frequent causes of failure. But, after all, it must be admitted that agricultural authorities are not prepared to speak with positiveness of the conditions which are essential to success with this crop.—Ed.]

Recent Plant Portraits.

Eucalyptus calophylla, *Revue Horticole*, September 16th; the Australian Red Gum, which Monsieur André recommends for general cultivation in southern Europe, for its ornamental qualities.

Cattleya labiata, var. magnifica, *Gartenflora*, September 15th.

Quesnelia Wittmackiana, *Gartenflora*, September 15th.

Pentstemon rotundifolius, *Gardeners' Chronicle*, September 8th.

Pinus Pyrenaica (vera), *Gardeners' Chronicle*, September 8th.

Arauja graveolens, *Gardeners' Cronicle*, September 8th; a beautiful, white-flowered stove-climber, closely allied to and requiring the same cultivation as Stephanotis.

Rhododendron Collettianum, *Gardeners' Chronicle*, September 15th; a dwarf species from the Kuram Valley of Afghanistan.

Convolvulus tenuissimus, *Gardeners' Chronicle*, September 15th.

Chironia peduncularis, *Gardeners' Chronicle*, September 22d.

Pentapera sicula, *Gardeners' Chronicle*, September 22d.

Passiflora Miersii, *Gardeners' Chronicle*, September 29th.

Ursinia pulchra, *Gardeners' Chronicle*, September 29th.

Ruapellia grata, *Gardeners' Chronicle*, September 29th.

Botanical Magazine, October, Howea Belmoreana, *t.* 7018; this, the *Kentia Belmoreana* of many gardens, is a small and graceful cool-house Palm from Lord Howe's Island, off the eastern coast of Australia.

Rhododendron Collettianum, *t.* 7019; an alpine white-flowered species, from the high Afghan mountains, introduced by Dr. Aitchison; of considerable horticultural value.

Iris Alberti, *t.* 7020; a handsome species, with large, bright lilac flowers, lately discovered by the Russian botanists in the mountains of Turkestan, whence it was introduced into cultivation by Dr. Albert Regel, whose name it bears. Its botanical interest is considerable, as Mr. Baker points out, in its rudimentary crest and fully-developed beard down the claw of the outer segments of the perianth, thus forming a connecting link between the sub-genera, *Pogoniris* and *Evansia*.

Disa racemosa, *t.* 7021; a very handsome Cape species, with bright rose-red flowers.

Asarum macranthum, *t.* 7022; a native of Formosa.

Recent Publications.

Entomology for Beginners, for the use of young folks, fruit-growers, farmers and gardeners. By A. S. Packard, M.D., Ph.D. New York: Henry Holt & Co.

The modest title of this book hardly does justice to its scope. Many amateur entomologists who are neither young folks nor beginners will find instructive hints to aid them in collecting and rearing insects, in preserving and dissecting them for study, mounting them for the microscope and preparing them for the cabinet. It is for beginners, however, that the book has been primarily prepared, and those who wish to enter upon a course of serious study cannot find a better treatise upon the elements of entomological science. According to the classification adopted, the class of insects is divided into sixteen orders, beginning with the lowest or wingless order, Thysanura, and ending with the most complicated group, the Hymenoptera. This agrees not only with the succession of insects so far as this is known in geologic time, but it probably coincides with the order of evolution. This change in classification seems to grow naturally out of our increased knowledge, but Professor Packard points out that the adoption of a larger number of orders is most convenient in view of the great number of species now existing. There are something like a million of these, and it is unnatural to crowd them all into the old Linnæan orders. The chapter on

"Economic Entomology," gives brief accounts of the more injurious of the insects which annually destroy perhaps $100,000,000 worth of the agricultural products of the country, together with the best means of checking their ravages. Throughout the entire work there are abundant references to other books, and there is a valuable classified catalogue of the books needed by the entomological student. The copious glossary and full index adds much to the practical value of the book, and altogether it ought to prove useful as a text-book for schools and colleges, and especially for agricultural colleges, and it will no doubt encourage a more general and more careful study of the modes of life, the transformation and the structure of insects, than has yet been given to the subject in this country.

Notes.

Apple blossoms are not unknown in autumn, but they are rarely seen in profusion. Mr. Dawson writes that in the last week of September one tree of *Pyrus baccata* was nearly covered with bloom.

The experiments made in the cultivation of the Cinchona on Mount Bavi, in the French province of Tonkin, having proved entirely satisfactory, it is now proposed to establish large plantations of these trees there.

The Philadelphia Chrysanthemum Show, which opens on the 13th and closes on the 16th of November, promises to be unusually fine, both in cut flowers and specimen plants. The cut Roses at that time will also be finer than are now to be had.

The French Society of Acclimatation recommends the cultivation of *Crocus Haussknechtii*, a Persian species for the production of saffron, on account of its superiority over the common *C. sativas* generally cultivated in some parts of the Levant for this purpose.

The old Scotch Rose (*Rosa spinosissima*) is now the most attractive of the black fruited kinds, and the wonderful shades of orange and scarlet worn by the hips of *R. rugosa*, *R. acicularis*, *R. rubrifolia*, *R. alpina*, *R. cinnamomea*, *R. subglobosa*, and *R. nitida*, ought to insure a more general use of these plants for the beauty of their fruit alone.

Mr. P. W. Reasoner died at his home in Manatee, Florida, of yellow fever, on the 17th of September. Mr. Reasoner, who was only in his twenty-sixth year at the time of his death, was one of the most active and progressive horticulturists of the South, and had already won for himself a reputation which extended beyond the limits of his adopted State. He was a welcome and valued contributor to the pages of this journal.

We learn from the *Gardeners' Chronicle* that, under the name of *The Orchidenne*, a society of amateur Orchid-growers was founded in Brussels on the 23d of September. The object of the new society is to foster the taste for, and promote the culture of, Orchids. This is to be effected by meetings and monthly exhibitions, lectures, and by a great annual exhibition, the first of which will be held next spring. There are seventy foundation members in the society.

The most interesting feature of the horticultural display made in Springfield, Massachusetts, last week, in connection with the Bay State Agricultural Society's Exhibition, was a collection of 250 varieties of Potatoes, including many seedlings, staged by Mr. G. C. Bond, of Holden, Massachusetts, and raised without other fertilizer than the Soluble Pacific Guano, manufactured by the Pacific Guano Company, of Boston. It is believed that this is the largest and most interesting collection of Potatoes ever exhibited by one grower in the United States.

The interest now taken in the cultivation of new and rare Orchids in this country, and the prices which Orchid growers are willing to pay for them, is illustrated by the fact that dealers are willing to incur enormous expenditures to satisfy the demands of the trade. Messrs. Siebrecht & Wadley, of New York, have had for nearly a year a collector traveling in Brazil for the special purpose of obtaining a supply of the rare autumn-flowering form of *Cattleya labiata*, besides other collectors constantly seeking for novelties in different regions of Central and South America.

The great Orchid growing establishment of the Messrs. Sander, at St. Albans, England, of which mention has often been made in our columns, has had a branch establishment in this country for the past two years, their business being conducted in Jersey City, under the superintendence of Mr. I. Forstermann. Mr. Sander recently arrived in New York, and has selected a site at Summit, N. J., where he is building a number of Orchid houses. It is his purpose, before returning to England, to visit all the fine collections of Orchids in the western as well as in the eastern States.

Symplocos paniculata, a fine Japanese shrub which was described while in bloom in "Notes from the Arnold Arboretum," is now thickly covered with berries in small bunches. The fruit is a bright ultramarine blue, and makes the shrub conspicuous among those which are valued for ornamental fruit. Another comparatively new shrub, *Panax sessilifolium*, is now showing large heads of deep black fruit, which hangs on the branches long after the large compound leaves have dropped. The old-fashioned Snowberry is one of the few shrubs with white fruit. When growing in a deep, rich soil it has a rare beauty in autumn, and is a graceful plant at all times.

Some exceptionally large trees, of which mention was recently made in *The Garden* (England), are: A Yew tree in the churchyard at Down, which, at three feet from the ground, has a girth of twenty-eight feet, and preserves its branches and foliage well, although its stem is hollow and crumbling; a Purple Beech at Holwood House, which, at three and a half feet from the ground, measures eleven feet, with a height of fifty feet and a branch spread of seventy-five feet diameter; a Cut-leaved Alder on one of the Hollydale lakes, which has a circumference, at a yard from its base, of six feet and a branch spread of forty-five feet diameter; and an Ailanthus (a tree which is not often seen of large size in England) which grows at Down House, the former residence of Charles Darwin, and measures six feet and nine inches at two feet from the ground. A Eucalyptus, which was planted in 1880 in the gardens of Earl Jersey at Baglan House, is noted as having already reached a height of twenty-nine feet.

No shrub has been more popular this year than *Hydrangea paniculata grandiflora*. It has appeared in every direction, grown in pots and in beds, in single specimens and in groups often of very great extent, in cottage gardens and on villa lawns, and profusely in almost every large country place. Very showy when in bloom and blooming late in the season, it has certainly strong claims to the favor it has won. Yet it should, perhaps, be called an effective rather than a really beautiful plant. To some eyes the singular color of its flower panicles, shading from cream color to a dull pink, is its greatest attraction; but to others it wears an unwholesome look, as though a tint which should be stronger, or, at least, clearer and purer, had been imperfectly developed. This, however, is a question of taste. The only sure fact is that it is very possible to have too much even of a good thing, and that in certain places—as at Newport—there have undoubtedly been too many of these Hydrangeas. In passing a hundred villas it became very tiresome to see a hundred successive clumps of so conspicuous a plant.

At a meeting of the Social Science Association, held in Saratoga during the first week of September, a paper was read by Dr. Lucy M. Hall, of Brooklyn, on "The Sanitary Condition of Country Homes." Sixty-five farm-houses of an average type had been carefully examined by the speaker in the New England, Middle and Western States, and the conclusions drawn from her survey are well worthy of note, both by the farmer, who lives in such homes all the year round, and by the inhabitant of cities who depends upon them to furnish himself and his family with refreshment for mind and body during the summer months. Over half these houses, Dr. Hall asserted, were built on wet clay soil, and it seldom appeared that any regard whatever had been paid to questions of subsoil and drainage. Fifty-five per cent. of the houses, again, were too closely shaded, sunlight being excluded from almost all their windows or from every one. Piazzas were likewise too extensive, their roofs still further excluding air and light. Nor had the character of shade-trees been more carefully considered than their number and proximity. Barns and stables were found in much too close connection with the house, their average distance being in New England not quite twenty-nine feet. The result of all these various ways of disregarding sanitary conditions was shown by the "clinical history" of these sixty-five farm-houses for a period of several years. Fifty-five per cent. in New England had a record of typhoid fever, and ninety-three per cent. of lung troubles and diphtheria, while rheumatism was everywhere.